What is Claimed is:

1. An anaerobic microbial fermentation process for the production of acetic acid, said process comprising the steps of:

(a) fermenting in a bioreactor an aqueous stream comprising a nutrient mixture with an anerobic acetogenic bacteria and at least one gas selected from the group consisting of(1) carbon monoxide, (2) carbon dioxide and hydrogen, (3) carbon monoxide, carbon dioxide, and hydrogen, and (4) carbon monoxide and hydrogen, thereby producing a fermentation broth comprising acetic acid and dissolved carbon dioxide;

(b) removing said carbon dioxide from the fermentation broth prior to extraction;

(c) contacting said broth (b) with a solvent comprising an amine for a time sufficient to cause the formation of a solvent phase containing acetic acid, said solvent and water; and

(d) continuously distilling acetic acid from said solvent phase.

2. The process according to claim 1, wherein said fermentation broth further comprises dissolved hydrogen sulfide and said process further comprises the step of removing said hydrogen sulfide from said fermentation broth prior to extraction.

3. The process according to claim 1, wherein said removing step comprises contacting said fermentation broth with a gas which does not contain carbon dioxide, oxygen or hydrogen sulfide.

4. The process according to claim 3 wherein said gas is selected from the group consisting of nitrogen, methane, helium, carbon monoxide, carbon monoxide, argon, hydrogen, a non-reactive gas or a mixture thereof.

5. The process according to claim 3, wherein said removing step occurs in a countercurrent stripper column.

6. The process according to claim 1, wherein said removing step comprises reducing the pressure on said fermentation broth in a container separate from said fermenter.

7. The process according to claim 1 further comprising separating said bacteria from other components in said broth to provide a substantially cell-free stream prior to said removing step.

8. The process according to claim 7, wherein said removing step comprises heating said cell-free stream to about 80°C in a container separate from said fermenter.

9. The process according to claim 1, wherein said solvent comprises

(i) a water immiscible solvent comprising greater than 50% by volume of a mixture of isomers of highly branced di-alkyl amines, and from about 0.01% to 20% by volume of mono-alkyl amines, said solvent having a coefficient of ditribution greater than 10; and

(ii) at least 10% by volume of a non-alcohol co-solvent having a boiling point lower than the boiling point of said solvent (i),

wherein said mixture extracts acetic acid from aqueous streams.

10. The process according to claim 9, wherein said distilling step occurs at a temperature less than about 160°C, without substantially degrading said amine to an amide, thus enhancing the efficiency of production of acetic acid.

11. The process according to claim 1, further comprising recycling said solvent and said bacteria into said fermenter.

12. The process according to claim 1, wherein said anaerobic bacteria is selected from the group consisting of *Acetobacterium kivui, A. woodii, Butyribacterium methylotrophicum, Clostridium aceticum, C. acetobutylicum, C. formoaceticum, C. kluyveri, C. thermoaceticum, C. thermocellum, C. thermohydrosulfuricum, C. thermosaccharolyticum, Eubacterium limosum, Peptostreptococcus productus,* and *C. ljungdahlii*, and mixtures thereof.

13. The process according to claim 12, wherein said *C. ljungdahlii* is selected from the group consisting of: PETC ATCC 49587, O-52 ATCC 55989, ERI2 ATCC 55380 and C-01 ATCC 55988, and mixtures thereof.

14. The process according to claim 1, wherein said contact with solvent occurs in a countercurrent column.

15. A modified water-immiscible solvent useful in the extraction of acetic acid from aqueous streams comprising a water-immiscible solvent comprising greater than 50% by volume of a mixture of isomers of highly branched di-alkyl amines and from about 0.01% to 20% by volume of mono-alkyl amines, said solvent having a coefficient of distribution of greater than 10.

16. The solvent according to claim 15, which is substantially reduced in its content of low boiling compounds and mono-alkyl amines.

17. The solvent according to claim 15, which is substantially purified of tri-alkyl amines.

18. A method for preparing a solvent comprising distilling from a solvent comprising low boiling compounds, monoalkyl amines, highly branched di-alkyl amines and tri-alkyl amines substantially all said low boiling compounds and monoalkyl amines, thereby improving its acetic acid extractive capacity.

19. The method according to claim 18, further comprising subjecting the distilled solvent to a second distillation to reduce substantially all tri-alkyl amines.

20. The modified water-immixcible solvent according to claim 15, comprising about 85% to about 91% by volume of a mixture of isomers of highly branched di-alkyl amines and from about 0.01% to about 5% by volume of momo-alkyl amines, wherein said mono- and di-alkyl amines have from 12 to 14 carbon atoms, said solvent having a coefficient of distribution of about 10 to about 20.